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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/502,071	07/19/2004	Dennis W. Prather	00131-00288-USA	2021

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EXAMINER

PETKOVSEK, DANIEL J

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 08/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/502,071	Applicant(s) PRATHER ET AL.	
	Examiner <i>DAJ 8/2/06</i> Daniel J. Petkovsek	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment filed June 7, 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the amendment filed June 7, 2006. In accordance with the amendment, claim 22 has been amended, while new claims 29-41 have been added:

Claims 1-41 are pending.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Cotteverte et al.

U.S.P. No. 6,542,682 B2.

Cotteverte et al. U.S.P. No. 6,542,682 B2 teaches (Figs. 22, 28-31; column 11, lines 5-39; column 14, line 9 through column 15, line 64) an electro-optic switch (and inherent method of using same) comprising: a planar photonic crystal structure having 1st and 2nd waveguides (210 & 220), wherein the 1st waveguide 210 is adjacent to the 2nd waveguide 220 along a coupling length, and a change in conductance (due to electro-optic actuation) along the coupling length provides an electro-optic switching function between the 1st and 2nd waveguide, which clearly, fully meets Applicant's claimed limitations.

Regarding independent claims 8 and 15, the photonic crystal waveguide structure has a photonic bandgap (column 2, lines 41-43 et al.).

Art Unit: 2874

Regarding claims 2, 3, 9, 10, 16, 17, 23, and 24, the photonic crystal can be arranged in either a square or hexagonal lattice (see column 7, lines 34-36).

Regarding claims 4-7, 11-14, 18-21, and 25-28, the propagation constants of the 1st and 2nd waveguides are equivalent and couple to each other all optical wavelengths in the *symmetrical* arrangements as shown in Figs. 22, and 28-31.

3. Claims 1, 8, 15, 22, 31, 34, 37, 40, and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by Allan et al. US 2002/0021878 A1.

Allan et al. US 2002/0021878 A1 teaches (Fig. 25, [0064]) an electro optic switch (and inherent method of using same) comprising: a photonic crystal material having first 170 and second 172 waveguides provided therein, wherein the first waveguide is adjacent to the second waveguide along a coupling length, and a change in conductance along the coupling length provides for electro-optic switching between the first and second waveguides (see [0064]), which clearly, fully meets Applicant's claimed limitations.

Regarding independent claims 8 and 15, the photonic crystal waveguide structure has a photonic bandgap (see ABS).

Regarding claims 31, 34, 37, and 40, the control of Allan et al. '878 serves to *modulate* the coupling of the device.

Regarding claim 41, the optical absorption coefficient will inherently change when the device of Allan et al. '878 is electrically controlled to actuate an optical switching function.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2874

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 29, 30, 32, 33, 35, 36, 38, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allan et al. US 2002/0021878 A1.

Allan et al. US 2002/0021878 A1 teaches (Fig. 25, [0064]) an electro optic switch (and inherent method of using same) comprising: a photonic crystal material having first 170 and second 172 waveguides provided therein, wherein the first waveguide is adjacent to the second waveguide along a coupling length, and a change in conductance along the coupling length provides for electro-optic switching between the first and second waveguides. Allan et al. '878 does not *explicitly* teach the change in conductance is induced by electrical carrier injection or optical induced by electron-hole pair generation (claims 29, 30, 32, 33, 35, 36, 38, and 39).

However, a person having ordinary skill in the art at the time the invention was made would have recognized that changing conductance along a coupling length by a number of well known change of conductance processes would have been an obvious modification of the prior art to Allan et al. '878. It is well known in the art of electro-optical switching to change the conductance of a material by the use of electrical carrier injection or electron-hole pair generation. Official notice has been taken to the use of these well-known forms (carrier injection or electron-hole pair generation) of changing conductance in an electro-optical switch.

Response to Arguments

6. Applicant's arguments filed June 7, 2006 have been fully considered but they are not persuasive. Applicant traverses the rejection to Cotteverte et al. '682 by asserting that the applied reference is silent on controlling propagation of the optical signal by controlling or

Art Unit: 2874

changing conductance along the coupling path (page 8, lines 6-7 of amendment filed June 7, 2006). The Examiner respectfully disagrees with this assertion.

In one embodiment, Cotteverte et al. '682 teaches (column 11, lines 5-25) that the piezoelectric substrate is actuated, which in turn causes the electro-optic switching as described. The Examiner asserts that when the piezoelectric substrate is actuated, the conductance of the piezoelectric substrate (which is along the coupling length) is changed. As such, the *claimed* limitations of independent claims 1, 8, 15, and 22 are met, since a "change in conductance (of the piezoelectric material) along the coupling length provides electro-optical switching between the first and second waveguides. Applicant is reminded that the Examiner must give the broadest reasonable interpretation to the claimed limitations.

Applicant's additions of new claims 29-41 have necessitated the new rejections made under Allan et al. '878 (including all independent claims 1, 8, 15, and 22). As such, the finality of this office action is proper.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37


Art Unit: 2874


CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Petkovsek whose telephone number is (571) 272-2355. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Daniel Petkovsek
August 2, 2006


SUNG PAK
PRIMARY EXAMINER